American Fruit Grower

SEPTEMBER · 1954

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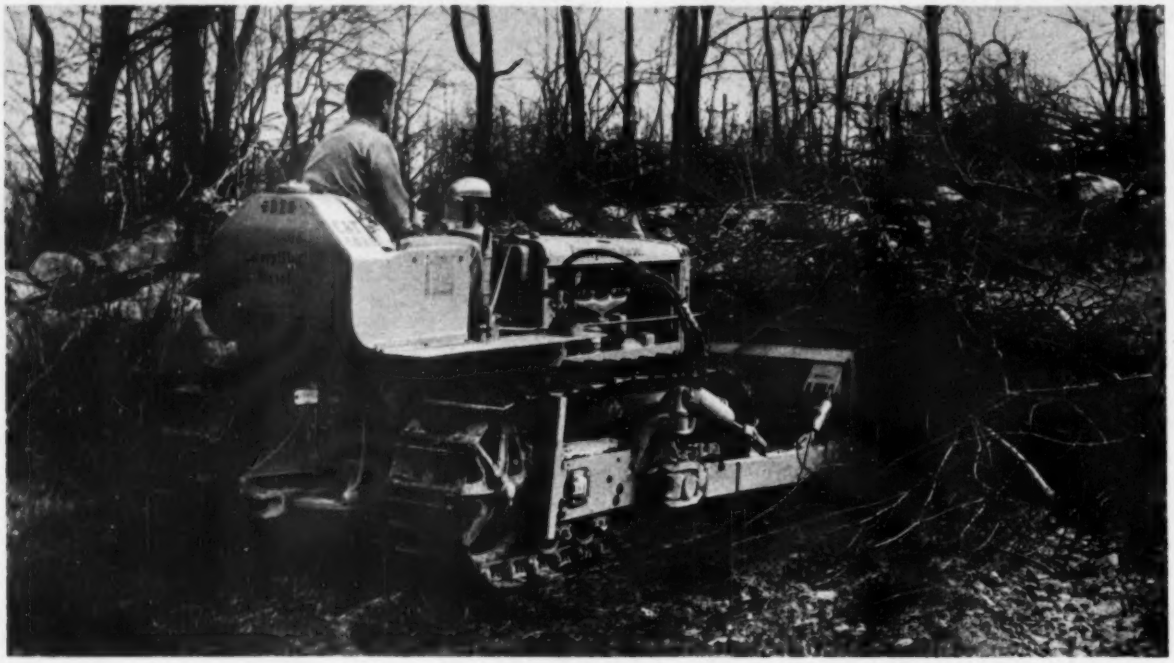

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LETTERS TO THE EDITOR

Grape Phylloxera

Dear Editor:

I wish to express my appreciation to you for publishing my article on grape phylloxera in your magazine recently. I am sure that phylloxera control is the number one problem in New York viticulture. For the study of this matter I started my experiments in the Urbana Wine Co.

In the region of Geneva, N. Y., I selected eight native wild *Vitis riparias* and at Montreal and Joliette, Canada, three more species of riparias which I believe to be the best rootstocks for eastern America grape regions.

My preliminary testing during two years of experiments shows that the above varieties offer a good adaptability for Concord. This last spring I made 13,800 bench grafts which came out from the stratification room very well and are now planted in a nursery in Hammondsport. I grafted Concord on 21 different rootstocks, including the eight new rootstocks of my selection.

In my experiment six European grape varieties, which I received from Dr. Winkler of the University of California were grafted: Riesling, Cabernet Sarvignon, Pinot Gris, Noir, Pinot Chardonay, and Alicante. My experience shows that they are cold hardy enough to be planted and cultivated in the East. I grafted five American grape varieties and French hybrids, too. They were: Concord, Catawba, Dutches, Ravat N6, and one Muscat type, S.P. 14287 from France.

Hammondsport, N. Y. Konstantin Frank

Fruit Growing in Scotland

Dear Editor:

We would appreciate your help with the following. We have been lucky enough to come by two trees of Stayman Winesap. Our trees are only five years old, but bore fruit for the first time this year. The fruit seems to ripen about four to five weeks after Golden Delicious. The apples are large, very red in color, and have exceptionally fine flavor. They seem to be fairly soft and more subject to bruising than Golden Delicious.

Is this variety popular in America? Is a fairly heavy drop of fruit characteristic? How does it compare with Winesap? Is it a heavy and consistent bearer? Is the fruit a good storer. Is the Blaxtayman related to the Stayman and if so, does it compare commercially?

Our two ranches consist of about 700 acres of apples, pears, and peaches. We make extensive use of undertree Rainbird sprinklers. We enjoy a fairly mild summer climate—rainfall occurs over the whole 12 months, but only about three inches fall during the growing season.

We average about 300 pounds of apples per mature tree, which is very low in comparison with yours. The trees are planted 90 to the acre. The soil depth is very poor in comparison with yours—only about two and one-half feet in most places. We do not have snow on the ground, although it covers the mountains for short periods during the winter months.

Elgin, C. P., Scotland D. H. D. Moodie

Stayman Winesap was originated from seed of Winesap in 1866 at Leavenworth, Kans., by Dr. J. Stayman, and bore its first fruit in 1875. It is a popular variety in America and is grown principally in the Appalachian area of Virginia, Maryland, Pennsylvania, and West Virginia. The fruit is a good storer and is one of the last apples on the markets. One of the big difficulties has been its tendency to crack, and this has caused considerable trouble for growers in eastern sections of the United States. Winesap has somewhat smaller fruit and is a better keeper.

Blaxtayman is a bud sport of Stayman and develops darker color.—Ed.

A Way to Get Names of Customers

Dear Editor:

Articles on mail order fruit business are always of interest to me, and I thought perhaps your readers would like to hear of my experience.

It happened that I had considerable acquaintances among restaurant and hotel owners in Atlantic City to whom I had regularly sold poultry and eggs. "Here," I thought, "is an opportunity to hand-pick my customers."

So, I went to the owners of a dozen or so hotels and restaurants which catered to a good class of people with the following idea. I offered to furnish them with all the apples they needed for a particular day, free, if they would place my card beside the customers' plates. The hotels and restaurants consented to the arrangement. The quantity consumed during that one day—Labor Day—was over 50 bushels. It seemed a pretty high price for the advertising, but I expected results from those cards—and I got them. The hotels and restaurants gave out nearly 1,500 cards during the day and 225 of those receiving cards requested prices and information within a few days.

I personally called on each inquirer and obtained 125 orders. The customers that I obtained the first year were delighted with my products, and they assisted me in getting hundreds of other customers. I now have developed a systematic way of handling the trade. Early in the fall I call on all my customers to obtain their orders. In addition to fine quality, I offer my customers a slight price advantage over the retail stores.

I also put out my cards at county and state fairs each season, just when the early apples are ready. I then take orders for my winter apples. With this method I can sell all my winter apples before Easter.

Hammonton, N. J. James Shoemaker

Small Grower Speaks

Dear Editor:

I was interested in the comments about the small fruit grower versus the large commercial grower in your "Letters to the Editor" column, June issue.

For my small orchard of 70 trees the investment in equipment and materials for profit alone may not be warranted. Fruit growing is exacting and demands much courage, fortitude, and strength of character to produce a quality product. As one works with and beholds the wonders of nature, these characteristics are more firmly moulded. There is no place for the weakling.

When a grower walks through his rows of trees laden with quality fruit and appreciates the work of nature with his help, the satisfaction derived cannot be measured in dollars.

Rochester, N. Y. Ormond W. Robbins

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"Getting in and out is easier than any truck I ever owned," says Mr. Teator of his new Ford DRIVERIZED Cab. He finds that Ford's exclusive seat shock snubbers, non-sag springs and independently adjustable seat back pay off in comfort that's a welcome relief to any working man.

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"Goes great in tough going." The high, 5900-lbs. total axle capacity of Mr. Teator's Pickup—higher than any other pickup—is just one reason for its dependable performance.

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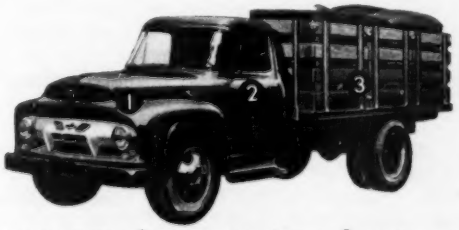
"My wife was surprised how smart the new truck looked inside and out." Ford's new free-breathing woven plastic upholstery is practical as well as smart. It rides cooler, is easier to clean.

"Everybody on the farm gets a kick out of the new Ford," says Mr. Teator, "and I couldn't be more pleased with it myself. I'd advise anyone thinking of buying a new truck for their farm to make it a Ford."



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SEPTEMBER 1954

VOL. 74 No. 9

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VIRUS-FREE TREES *for* Tomorrow's Orchards

A strenuous research program is in progress to produce true-to-name disease-free stock

By PAUL STARK, Jr.

UP until 1930 virus diseases of fruits were of minor importance in fruit economics. It's true that phoney peach disease had cleaned out the Fort Valley peach area of Georgia on two occasions and yellows was a factor in some peach orchards. Mosaic had been serious in some areas of Colorado, New Mexico, Texas, and California, but these diseases were easily identified and, thanks to an active and alert government, orchard and nursery inspection program losses to fruit growers were held to a minimum.

In recent years rather spectacular changes have taken place in the virus situation that have resulted in tremendous losses to fruit growers not only in peaches but in other fruits as well.

An estimated $5 million loss is reported in the Montmorency cherry variety from yellows, with some tree declines of 50 per cent or more in productive capacity. Sweet cherry albino kills entire trees in a relatively short period and with conditions favorable for rapid spread can clean out an orchard in two to three years. One Rogue River Valley orchard in southern Oregon showed 38 per cent of the trees infected the first season the disease was noted and the following year 90 per cent.

Little cherry with its phenomenal rate of spread has ruined cherry production in the Kootenay area of British Columbia in just a few years. The Western X disease which is caused by the same virus as little cherry is a real menace to peach orchards in the Northwest.

Viruses are no longer important only to stone fruits but in some parts of the world apples and pears, as well as practically all other fruits of commercial prominence are affected. Stony pit is already a factor in Northwest pear growing, and state authorities along with progressive nurserymen are getting ready to take care of apple virus problems that are looming on the horizon. This is already a factor in some areas south of the equator.

Oregon State College

Tree on right shows severe reaction of ring spot on peach, resulting in stunting and rosetting of foliage.

The point of major concern with many of the new viruses in stone fruits is that they are difficult to identify by sight inspection and the disease may have made a big start and rendered a high portion of the trees unprofitable before the grower knows what has happened. The situation is further complicated by some varieties that can tolerate diseases and show no symptoms but serve as a source of infection of other varieties. A case in point—cherry mottled leaf devastates our important sweet cherries Bing and Royal Anne, yet Republican and Lambert tolerate the disease with only minor economic losses.

So much for the potential hazards from virus diseases and the effects on the fruit economy. The big question being asked by growers is what are we going to do about it. Fortunately a lot has already been accomplished through the fine efforts of federal and state research men who are specializing in this challenge. Wonderful co-operation has been the secret of the successful attack on viruses, and even greater progress is on the horizon.

The first step as we see it is to have regular inspection of all orchards where virus diseases are known to occur. Following the inspection immediate removal of all trees showing positive symptoms of a dangerous infection is in order. Such a program has resulted in saving the peach area in the western slope of Colorado which for years has been threatened by the peach mosaic.

The next step is to eliminate the carriers of the diseases. These insects, known as vectors, suck the juices from diseased plants, migrate to a healthy tree, and in the process of getting their next meal spread the virus. The vectors of many of the important viruses have now been established and can be controlled with our highly effective organic chemicals—not perfect control but enough to make it an economically sound practice in many instances.

Another related control practice is the elimination of native trees and shrubs that are carriers. The common choke-

(*Continued on page 21*)

How to Correct NUTRIENT DEFICIENCIES

Watch the leaves of your apple trees for symptoms — then include the missing elements in your cultural or spray program

By NORMAN F. CHILDERS
Rutgers University

THERE are 15 nutrients needed for normal growth of the apple tree. Carbon, hydrogen, and oxygen are supplied through the air and moisture surrounding the tree. The remaining 12 mineral elements are nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, boron, zinc, copper, and molybdenum.

Under most apple orchard conditions in the East, all mineral elements except nitrogen have appeared to be in sufficient supply. In recent years, however, there has been a trend toward use of potassium, magnesium, and boron in addition to nitrogen. Spotty reports of deficiencies of some of the other mineral elements have been reported, namely manganese deficiency on apple, peach, and cherry in New York and on peach in New Jersey; zinc deficiency on peach and apple in southern New Jersey; and phosphorus deficiency on peach in North Carolina sandhills.

Most growers are probably not aware that they are using a number of the mineral nutrients needed by plants incidental to their fertilizer and spraying programs. For example, when you lime, you apply both calcium and magnesium. If you use dolomitic lime, you use considerably more magnesium than is found in regular agricultural limestone or hydrated lime. Calcium and some magnesium are supplied in the spray program where hydrated lime is used. Sulfur is applied to the orchard from a number of sources, mainly in the spray program and also in superphosphate, ammonium sulfate, or in Epsom salts if they are used, and from quite a number of other sources.

Ferbam supplies iron. We used to use zinc sulfate to safen lead arsenate, and some folks still do. This is a good maintenance source of zinc. Superphosphate is known to contain almost a full complement of minor elements but in very small supply. Boron is an impurity in most N-P-K fertilizers. Manganese has been used in the manufacture of some brandname sulfurs.

With the increased use of organic fungicides and insecticides in the spray program, higher purification of fertilizers, and less availability of manures, sources of many of the trace nutrients have been lost for the commercial orchard.

Potash, boron, and magnesium deficiencies have been reported in orchards where the soil is thought to be reasonably fertile. Magnesium deficiency may become a problem where the pH has been permitted to drop in the region of 5.0 or below, particularly under the trees. Boron deficiency on these soils may not be a problem except during drought periods. Drought, in fact, tends to aggravate any mineral element deficiency.

In most orchards potash deficiency does not usually appear until after the orchard has been in fruiting several years. However, there are reports in New York of rather severe potash deficiency on young non-bearing trees shortly after planting in soils which are low in potash.

You can be suspicious of a number of nutrient deficiencies in apple orchards located on light sandy soil types, which are low in organic matter. Nitrogen on these soil types can be a particularly bad problem when spring and early summer rains are heavy. Under these conditions it may be necessary to apply nitrogen more than once during the season. In the lighter soil types in central south Jersey, we have gotten response from applications of zinc, manganese, boron, and magnesium. With most of our apple growers, who are using ferbam, we have not given attention to the possibility of iron deficiency.

A mulching program is a good source of all nutrients essential to plant growth because in order to grow the mulch satisfactorily the required nutrients had to be taken up by the plants. Mulches vary tremendously, however, in their nutrient content, depending upon how fertile the soil was upon which they grew and the amount of fertilizer applied to them. Recent evidence from Beltsville, Md., shows that orchard grass mulch which had been fertilized and grown on fertile bottom land gave a decidedly different response in weak apple trees than did unfertilized mulch from infertile upland.

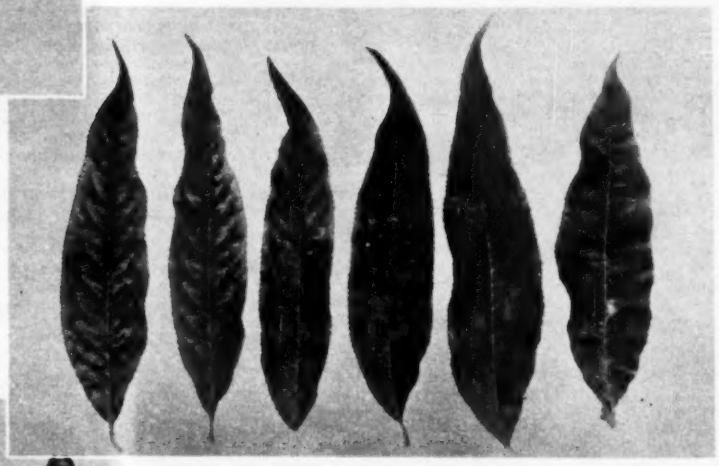
Stirring of the soil tends to release nutrients stored in the soil, particularly nitrogen, thus making them available to tree roots. Some orchardists in north Jersey, who have relatively more fertile soils of medium texture, have been stirring their soils to a depth of about six inches every third or fourth spring and have definitely invigorated their old, weaker trees. Due to use of heavy orchard equipment we have tended to develop hard-surface roads. Claw-type cultivators have relieved this to some extent.

A few of our growers are using the subsoiler, running on the outside drip of the branches, in one direction only,

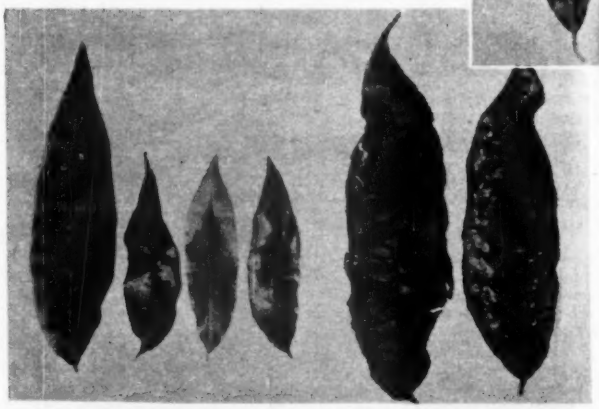
Above, left—Leaves of Delicious apples show zinc deficiency. Note the leaf rosettes. Analysis showed five to 10 ppm (parts per million) of zinc.

Zinc deficiency on peach leaves. Leaves at left have been dipped in zinc sulfate solution while those at right are non-dipped and show typical chlorosis remaining.

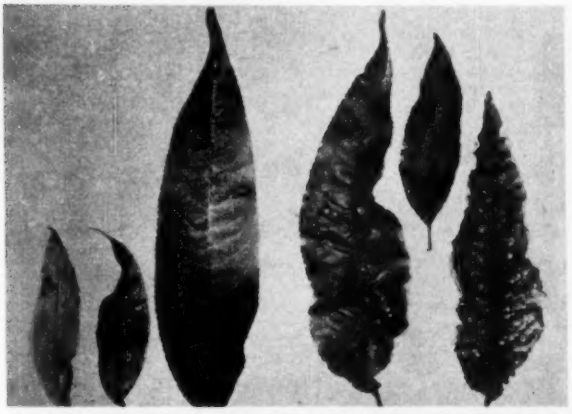
midshoot leaves, according to variety, may show yellowing between the main veins and scorching between the veins and along the margins. This may occur as early as midseason or as late as a few days before harvest. In fact, these symptoms have been reported as early as pink pre-blossom stage under severe conditions at Beltsville, Md. Leaf drop may be heavy before harvest; fruit drop may be heavy and coloring of the fruit poor. A heavy crop of fruit tends to aggravate the deficiency, although on some varieties such as McIntosh and Rome, fruit bud formation for a crop the following year does not seem to be affected.



Manganese deficiency of peach shows progression from right to left. Leaves contained seven ppm manganese as compared with 40 to 60 ppm found in normal leaves.



Four peach leaves at left with calcium deficiency show breakdown of leaf center. Two peach leaves at right with magnesium deficiency show breakdown areas of tissues between the main veins and a marginal scorch.



Two peach leaves at left show nitrogen deficiency. Compare small size with third leaf. Three peach leaves at right with potassium deficiency have dead spots between the main veins and marginal scorch.

on either side of a tree row in October or November when the soil is dry and shatters well. One of our growers swears by this practice because it seems to induce better storage of moisture in the soil during the winter and facilitates rooting of the trees and thus better feeding for the mineral nutrients.

Several of our growers who are using a combination of alternate row cultivation, shifting from one row middle to the other in consecutive years, and mulch and subsoiling, have their orchards in good annual bearing condition.

Several of the more important nutrient deficiency symptoms which may be found in eastern orchards are given below together with corrective measures:

Magnesium Deficiency—Basal and

For a long-time approach, lime the soil, particularly under the trees, to a little above pH 6.0, using high magnesium limestone or dolomite. Check the pH every two or three years and apply dolomite as needed. For immediate relief, use about 15 pounds of

(*Continued on page 16*)

State NEWS

- **Drought Makes Growers Irrigation Conscious**
- **Bigger Budget to Boost Appalachian Apples**

GEORGIA—The peach season has been the most successful in many years. Prices received held at a high level during entire season. Many growers have installed hydrocoolers. In addition, many growers are installing irrigation equipment as an insurance against future drought periods. Peach plantings are slightly on the increase.—*Earl F. Savage, Experiment.*

SOUTH CAROLINA — That peach growers are finding irrigation profitable this season is shown by recent reports of county agents. J. D. Miller, county agent, York, reports that many growers in that county irrigated peaches this year for the first time. He says that Land Brothers, York, irrigated their orchard several times during the season and as a result packed $2\frac{1}{4}$-inch and up peaches with an increase in price over $1\frac{3}{4}$-inch size peaches sufficiently large to probably pay for their irrigation system this year. W. J. Martin, Spartanburg county agent, says peach growers in that county with irrigation outfits ran them day and night and that irrigation really paid off.

WASHINGTON—In a statewide referendum under the direction of the department of agriculture, apple growers recently voted not to increase their advertising and merchandising assessment by one cent a box. As a result of the vote against the Washington State Apple Commission's proposal for an increase, the advertising assessment will remain at its present level of three cents a box.

KANSAS—Fruit crop conditions in many areas have been improved by recent rains. Trees and crops are in bad shape in many counties due to extreme heat as much as drought. Grasshoppers continue as a problem. Several peach and apple orchards are being irrigated.—*Wm. G. Amstein, Sec'y, Manhattan.*

NEW YORK—Dry weather in western New York, especially in Niagara County, will cut peach crop 10 to 15 per cent. Apples not hurt yet; crop will be larger than earlier guesstimates; quality excellent. Some irrigation of orchards.—*D. M. Dalrymple, Sec'y, Lockport.*

NEW JERSEY—A very serious drought hurt our fruit industry. Blueberry harvesting season halted rather suddenly in early August; with exception of early ripening varieties, crop was destroyed. Irrigation helped but many fields are not irrigated.—*Ernest G. Christ, Sec'y, New Brunswick.*

VIRGINIA—Local showers have helped fruit crops in spots; other places suffering severe drought. Prospects better so far than last year for apple crop.—*John F. Watson, Sec'y, Staunton.*

MARYLAND — Those rains came along in early August just in time to add a little to the peach and apple crops. It will take a lot of water to put sufficient moisture back into the soil but even so, many more growers will be ready to irrigate their orchards in 1955, if necessary.—*A. F. Vierheller, Sec'y, College Park.*

RHODE ISLAND—Apple crop is much better than ever before, due, most growers claim, to use of captan. Light crop of Macs, large crop of early and late varieties.—*G. H. Smith, Sec'y, Slatersville.*

The proposal set forth by directors of Appalachian Apple Service has been accepted by sufficient growers in the four-state belt to warrant the launching of a $50,000 early season newspaper-TV-radio advertising program. Advertising will start September 16 and will continue for eight weeks. The program calls for a voluntary pledge of two cents per bushel on all apples grown and sold, packed or bulk, by growers who join. The board set a minimum of five million bushels to yield $100,000. An estimated five and one-half million bushels have been pledged, for a total advertising fund of over $111,000. This is more than double Appalachian's usual yearly advertising budget.

MAINE — Season has been unusually wet, making orchards difficult to care for. Apples are growing and coloring well. Some orchards have been hit hard by hail.—*F. J. McDonald, Sec'y, Monmouth.*

INDIANA—Recent rains have temporarily helped serious drought in southern Indiana. Subsoil moisture is still lacking.—*R. L. Klackle, Sec'y, West Lafayette.*

MINNESOTA — Apple crop will be much shorter than earlier estimates due to heavy scab in marginal and farm orchards.—*J. D. Winter, Sec'y, Mound.*

MICHIGAN—The tart cherry crop was disappointing to growers. Final figures indicate actual crop not more than one-half of normal. Cherry leaf spot was severe in certain sections but with the use of actidione and copper sprays it is now under control.

Dr. A. L. Kenworthy of the department of horticulture has announced that a new service has been provided by Michigan State College to evaluate nutritional requirements of fruit trees by leaf analysis. Information regarding this service is obtainable through district horticultural agents or county agricultural agents.—*A. E. Mitchell, East Lansing.*

FRUIT PEST HANDBOOK

(THIRTY-SIXTH OF A SERIES)

SOOTY BLOTCH AND FLYSPECK OF APPLE

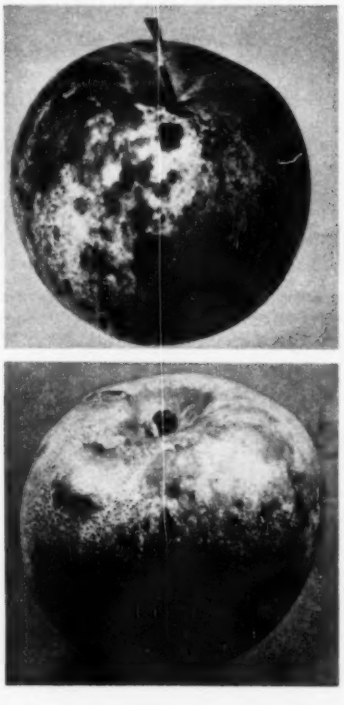
SOOTY blotch or cloud and flyspeck are two fungus diseases frequently found on maturing apples in orchards in humid sections. For some unknown reason, these two distinctly different fungi commonly occur together on apples. Both are native species and produce spores on a wide variety of trees and shrubs in the United States. It is presumed that apple infections are caused by these spores every year.

The sooty blotch fungus forms unsightly, various-shaped, dark-brown spots or blotches, while the flyspeck fungus produces small, roughly circular groups of slightly raised dark spots. While both fungi appear to be entirely superficial, since they can be removed by either rubbing or scraping the waxy coating of the apple, they actually do penetrate the skin of the apple to varying degrees.

Sooty blotch and flyspeck would be considered minor diseases were it not for the fact that the unsightly spots reduce the market value of the fruit and, by rupturing the waxy covering, the causal fungi accelerate the loss of water from the inner tissues. Apples with numerous sooty blotch spots shrivel within a few weeks and cannot be stored satisfactorily.

***Control.* Formerly these diseases were**

(Continued on page 12)



Photos show apples infected with sooty blotch (top) and flyspeck. *Courtesy USDA.*

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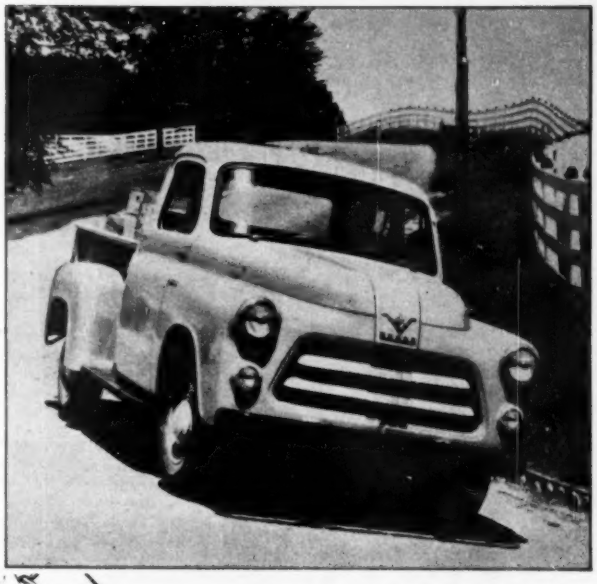

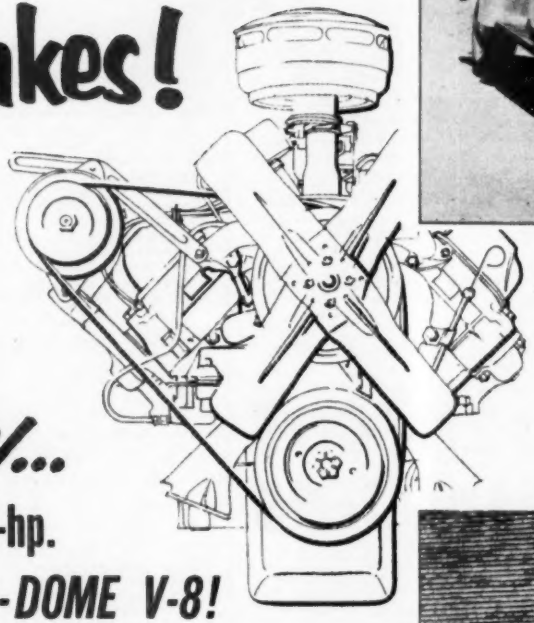

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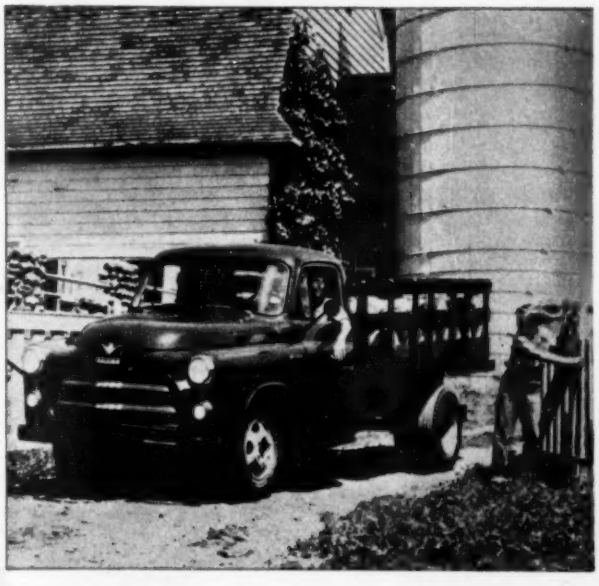

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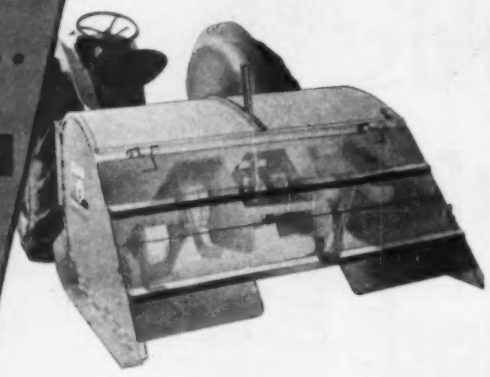

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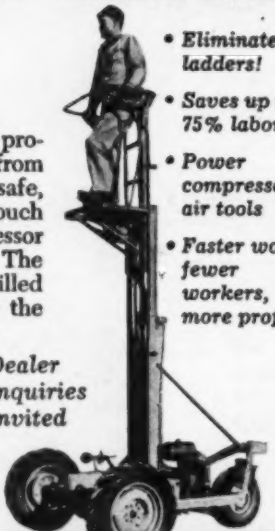

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CALENDAR OF COMING MEETINGS AND EXHIBITS

Sept. 17-18—Murphysboro Apple Festival, Murphysboro, Ill.—Harold J. Hartley, Sec'y, Ill. Hort. Soc., Carbondale.

Sept. 25-26—Calhoun County Apple Festival and Illinois State Fruit Queen Contest, Hardin, Ill.—Harold J. Hartley, Sec'y, Ill. Hort. Soc., Carbondale.

Sept. 28-30—Florida Fruit and Vegetable Association meeting, Hotel Sans Souci, Miami Beach.—George Talbott, FF&VA, Orlando.

Sept. 30-Oct. 1—Charlottesville Apple Harvest Festival, Charlottesville, Va.—John F. Watson, Sec'y, VSHS, Staunton.

Oct. 3-5—Produce Packaging Association 4th annual conference and exposition, The Shoreham Hotel, Washington, D. C.—Robert A. Cooper, Exec. Sec'y, 500 Fifth Ave., New York 36, N. Y.

Oct. 12-13—Texas Peach Growers' Association annual meeting, College Station.—Bluefford G. Hancock, Sec'y, Texas A&M College, College Station.

Oct. 20-22—Florida State Horticultural Society 67th annual meeting, Miami Beach.—Ernest L. Spencer, Sec'y, Bradenton.

Oct. 21-30—National Apple Week (Oct. 30, National Apple Day).—National Apple Week Assn., 1302 18th St., N.W., Washington 6, D. C.

Nov. 4-5—Minnesota Fruit Growers Assn., and Wisconsin State Horticultural Society joint annual meeting, Winona, Minn.—J. D. Winter, Sec'y, Minn. Assn., University Farm, St. Paul 1.

Dec. 1-2—Connecticut Pomological Society 64th annual meeting, Hotel Bond, Hartford.—S. P. Hollister, Sec'y, Storrs.

Dec. 6-8—New Jersey State Horticultural Society annual meeting, Hotels Claridge and Marlborough-Blenheim, Atlantic City.—Ernest G. Christ, Sec'y, New Brunswick.

Dec. 6-8—Washington State Horticultural Assn. 50th annual meeting, Capitol Theater, Yakima.—John C. Snyder, Sec'y, Pullman.

Early Dec.—Peninsula Horticultural Society, Dover, Del.—Robt. F. Stevens, Sec'y, Newark, Del.

Meetings in 1955

Jan. 5-6—Maryland State Horticultural Society 57th annual meeting, Hagerstown.—A. F. Vierheller, Sec'y, College Park.

Jan. 11-13.—Indiana Horticultural Society annual meeting, Murat Temple, Indianapolis.—R. L. Klackle, Sec'y, West Lafayette.

Jan. 19-20—Maine State Pomological Society annual meeting, Lewiston Armory, Lewiston.—F. J. McDonald, Sec'y, Monmouth.

Jan. 24-26—Virginia State Horticultural Society 59th annual meeting, Hotel Roanoke, Roanoke.—John F. Watson, Sec'y, Staunton.

Feb. 14-16—National Peach Council annual meeting, in joint session with Pennsylvania State Horticultural Assn., York, Pa.—M. J. Dorsey, Sec'y, NPC, 1502 S. Lincoln, Urbana, Ill.; John U. Ruef, Sec'y, PSHA, State College, Pa.

SOOTY BLOTCH

(*Continued from page 10*)

kept under control by adding a weak Bordeaux mixture to the insecticide sprays required to control the codling moth during the summer. In recent years, however, the newer organic insecticides have reduced the need for midsummer insecticide sprays and these diseases are now a problem in many orchards.

On all varieties except Golden Delicious these two diseases can be kept under control usually by spraying either with a weak Bordeaux (1-1-100) or with ferbam (one and one-half pounds to 100 gallons of water) from the middle of May until the end of July. The sprays should be applied at intervals of two to three weeks. During rainy seasons or in humid locations, it may be desirable to give the fruit additional protection by a spray applied August 15. Ferbam is superior to Bordeaux mixture for flyspeck but is not always effective for sooty blotch.

Growers of the Golden Delicious variety are confronted with a particularly serious problem for both Bordeaux mixture and ferbam injure this variety. Captan (two pounds to 100 gallons of water) is frequently used. It does not injure the finish of the fruit and gives fairly good control of sooty blotch and flyspeck.—*John C. Dunegan, USDA.*

American Fruit Grower
WESTERN SECTION

Sodium Hazard In WESTERN IRRIGATED SOILS

Here is information on how to deal with "slick spots" or black alkali soils

By H. E. HAYWARD

THE salinity problem in western irrigated soils was discussed in an earlier article. (See AMERICAN FRUIT GROWER, Western Section, August, 1953.) It was pointed out that, although many western soils are free from harmful amounts of salts and sodium, there are numerous areas under irrigation where the soils may be classified as saline, alkali, or saline-alkali. The principal factors to be taken into account in saline areas were indicated as the amount of soluble salt in the root zone and the quality of the irrigation water applied to the soil.

Methods for determining the salt status of a soil and those used to appraise the relative quality of irrigation waters with respect to concentration of soluble salts, and sodium and boron content were noted. The relative salt tolerance of various horticultural crops was discussed and it was pointed out that many of the fruit crops grown under irrigation in the western states are sensitive to relatively low levels of salinity.

The problem soils referred to above may be defined with respect to crop production as follows: *saline soils* contain sufficient soluble salts to impair crop productivity; *alkali soils* have enough exchangeable sodium to interfere with the growth of most crop plants but are low in soluble salts; and *saline-alkali soils* contain sufficient exchangeable sodium to interfere with the growth of most crop plants and also have harmful quantities of soluble salts.

Photograph shows moist "slick spot" in an abandoned field. Dark color is due to dissolved organic matter. This spot was slightly saline and high in exchangeable sodium.

Photo shows surface view of alkali or high-sodium soil. This type often has a dense blocky structure and is hard to till when dry.

It is the purpose of this article to consider the problem of alkali soils. Alkali soils frequently occur in semi-arid and arid regions forming irregular areas which are referred to by the grower as "slick spots" or "black alkali soils." These soils are relatively low in soluble salts but are high in sodium, referred to as "exchangeable sodium" because it is possible to displace the sodium from the surface of the soil particles with other cations such as calcium. The amount of exchangeable sodium present is commonly expressed as a percentage of the total cations (sodium, potassium, calcium, and

The author, H. E. HAYWARD, is director of U. S. Salinity Laboratory, Riverside, Calif.

magnesium) on the exchange complex of the soil.

When the exchangeable-sodium-percentage exceeds 15 and the amount of soluble salt is low, as measured in terms of the conductivity of the saturation extract, we have an alkali or high-sodium soil. High-sodium soils tend to be alkaline rather than neutral or acid in reaction and to have a dispersed rather than a crumb structure. This condition results in greatly decreased permeability to water and air.

In considering the effect of alkali soils on the growth of plants grown under irrigation, there are two distinct but closely interrelated aspects of the sodium problem. The first is the indirect effect of sodium upon plant performance owing to the changes in the soil which result from the accumulation of excessive amounts of sodium. The second is related to the direct toxic effect of the sodium ion on the plant or to nutritional deficiencies resulting from high exchangeable sodium.

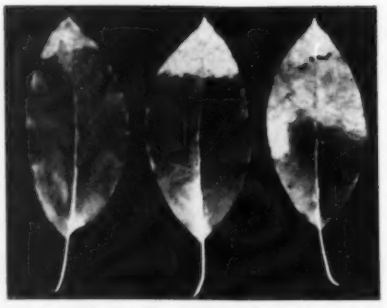
Effect of Sodium on Soil

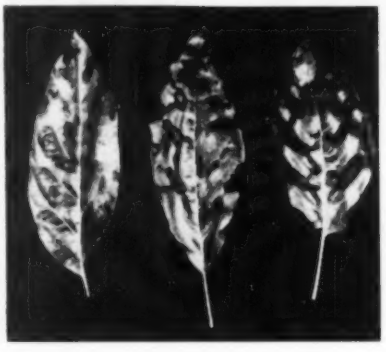
In a soil free from injurious amounts of soluble salts or sodium, the soil particles tend to be arranged in crumbs or aggregates which are more or less water-stable. This gives a soil a good structure and tilth. As the amount of sodium in the soil increases, there is a tendency for such soils to become more and more dispersed. They often have a dense blocky structure and are very hard to till when dry. They take water very slowly because the aggregates and the pores in these soils are not stable. When water is applied, the aggregates slake down and the pores become filled with finer soil particles.

Furthermore, as the soil becomes dispersed or deflocculated because of increased sodium content, the possibility of puddling increases, especially if the soil is irrigated with excessive amounts of water and subjected to over-tillage.

A puddled soil has a lower capacity for the interchange of gases which may result in a deficiency of oxygen at the absorbing surfaces of the roots. As the oxygen availability is reduced, the plant is less able to take in adequate quantities of water. Experimental work has shown that plants which are growing under normal conditions will wilt after the soil is puddled, even though an abundant supply of moisture may be present.

Other studies of western soils have demonstrated that an outstanding characteristic of sodium soils is that the rate of infiltration of water is very much less than on otherwise identical nonalkali soils. Because of poor infiltration, sodium soils are apt to be deficient in moisture most of the time,





Two photographs are of Fuerte avocado leaves. Upper photo shows typical chloride injury while lower photo shows typical sodium injury.

and owing to poor structure, replenishment of the soil moisture reservoir essential for plant growth is retarded.

Sodium Effects on Plant

Another factor in regard to sodium soils is the relation of increasing amounts of exchangeable sodium to the availability of other essential elements needed for plant growth. Observations by several investigators suggest that the presence of relatively high proportions of sodium on the soil particles may prevent the plant roots from obtaining an adequate supply of calcium.

For most plants that have been studied, the calcium becomes less available as the exchangeable-sodium-percentage exceeds 30 or 40 per cent. It has been noted that a characteristic of sodium soils is that in most cases they have a pH value of 8.5 to 10. A few plants are tolerant to a wide range in pH value, but there is usually a marked decline in growth at about pH 9 and plants do not thrive when the alkalinity is in excess of that value.

There is relatively little information about the direct injurious effects of sodium on plant growth and the evidence is not clear cut. It is known that plants differ in their ability to exclude sodium, and it has been shown that specific toxic effects may arise from the exclusion of sodium owing to an associated effect which results in the accumulation of anions such as chloride from the soil.

If the exchange complex of the soil becomes more than 40 to 50 per cent saturated with sodium, serious nutritional disturbances may result. For example, under such conditions the soil may remove calcium from the root tissues of the plant, and death will result because of a calcium deficiency.

The U. S. Salinity Laboratory has demonstrated that the addition of calcium and sometimes magnesium to high-sodium soils may improve plant growth very markedly because of an increase in the uptake of these essential cations by the plant. In general, it can be said that an increase in exchangeable-sodium-percentage results in a decreased accumulation of calcium, magnesium, and potassium in plants.

Leaf Symptoms

As in the case of saline soils, a high-sodium condition may cause a reduction in yield without pronounced evidence of injury, but a more frequent response is the development of specific leaf symptoms. Examples of crops which show specific effects of sodium include almonds, apricots, avocados, citrus, and plums.

The symptom of sodium injury in avocados is a leaf-burn pattern which, unlike chloride injury, does not start at the tip of the leaf but more usually causes necrotic or scorched spots which appear near the margin or in the interior area of the leaf. These dead areas are more pronounced at higher sodium levels and increase in size and number with time until most of the leaf is dead or until it drops.

It is not uncommon to find both chloride tip-burn and sodium scorch on the same leaf when there is an excess accumulation of both sodium and chloride. In such cases, the symptoms of chloride injury tend to mask those of sodium.

Dr. Omund Lilleland and coworkers at the California Agricultural Experiment Station have reported that sodium injury to almonds occurs in various orchards in the state. Tip-burn may be evident as early as May; and, as the season progresses, the scorch may involve the terminal-half and edges or the entire blade of the leaf. In some cases, the partially scorched leaves fall prematurely, and a second crop of leaves may develop.

In severe cases, young trees die within two or three years after the first appearance of the symptoms; in others, the trees survive but are stunted. Analyses of normal and scorched leaves indicated an excellent correlation between the sodium content of the leaves and the amount of sodium scorch evident. The Texas variety was more susceptible to sodium injury than other varieties, such as Nonpareil and Ne Plus Ultra.

Other studies on stone fruits confirmed the work on the almond and

also showed that the plum is particularly sensitive to sodium injury. Sodium was virtually excluded from the leaves of apricot and peach.

Sodium Toxicity of Citrus

Information regarding sodium toxicity of citrus varieties is not as clear-cut. Indications are that there is wide variation in susceptibility of citrus species to sodium and chloride injury which may be related to the rootstock-scion combination.

Dr. W. C. Cooper and his associates at the Texas Substation, Weslaco, Tex., have shown that more sodium and chloride are accumulated in the roots than in the leaves of citrus varieties grown in salinized plots. Grapefruit and Valencia scions were grown on Cleopatra Mandarin and sour-orange rootstocks. There was a significantly greater accumulation of sodium in the leaves of the grapefruit scion on both rootstocks than in those of the Valencia.

At the Salinity Laboratory, studies of the Ruby Red grapefruit on Cleopatra Mandarin rootstock indicate that the severity of injury increases as the accumulation of either sodium or chloride increases. The data obtained suggest that the injury on grapefruit trees may be due to a combined effect of chloride and sodium ions in the leaves in cases where both ions are accumulated.

The symptoms observed were defoliation, bronzing, burning, and mottling of the mature leaves. It appeared that defoliation was more closely related to injury to the trees than leaf-burn.

Diagnosis and Control

If the growth response of the crop, symptoms of injury, or the soil characteristics which may be observed indicate that a salt or sodium condition exists, it is important that a correct and accurate diagnosis be made in order to determine what preventive or remedial measures should be undertaken.

Representative soil samples should be taken in the root zone, and these should be carefully analyzed to determine salinity as measured by the conductivity of the saturation extract, and sodium status to determine whether or not a sodium problem exists. If this is the case, the gypsum content of the soil should be determined in order to decide whether or not amendments are needed.

If infiltration of water into the soil is slow, it is desirable to determine the hydraulic conductivity of a disturbed soil sample. This information will make it possible to diagnose the soil condition with respect to salinity, sodium, and permeability.

In many cases, the cause of an unfavorable soil condition may be attributed to the quality of the irrigation water applied and, for this reason, it is desirable to have an analysis of the irrigation water used to determine its salt and sodium status. If the water used for irrigation is from groundwater supplies, a boron determination is recommended because this ion is toxic to sensitive crops in concentrations as low as one or two parts per million.

If it is a case of too much salt in the soil, in most cases it can be solved by adequate leaching provided drainage conditions are satisfactory. The amount of leaching will depend upon the degree of salinization of the soil and, in part, upon the quality of the irrigation water which is applied to it. Some irrigation waters contain several hundred ppm of salt as, for example, Colorado River water (740 ppm).

In order to develop and maintain a satisfactory salt balance in such cases, it is necessary to apply enough water in excess of consumptive use (evapotranspiration) to remove excess salts from the root profile and carry them into the drainage ways.

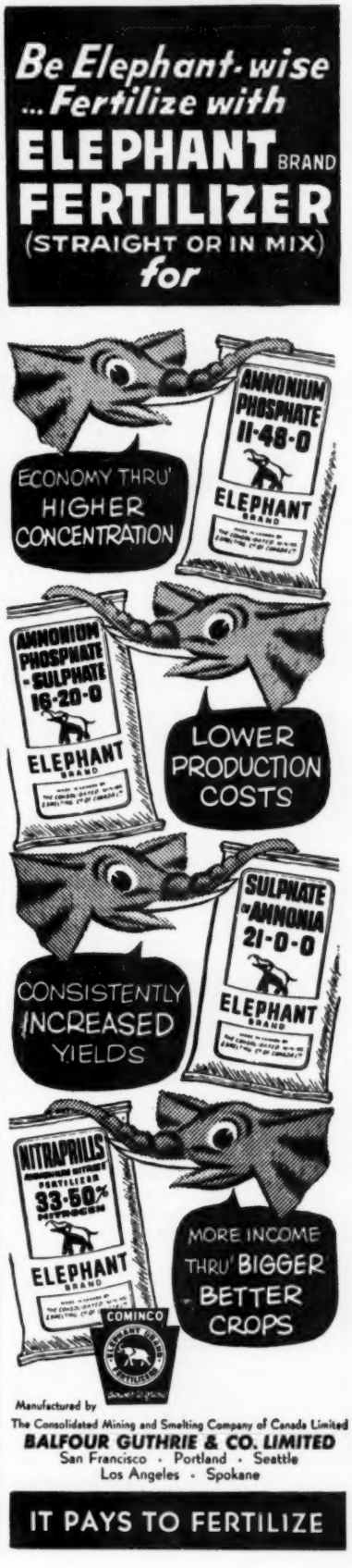
High Sodium Condition

If the data indicate a high-sodium condition, it may not be possible to eliminate the sodium hazard by leaching alone, unless the soil is high in gypsum content. If the latter is the case, the gypsum will slowly go into solution upon the application of leaching water, and the calcium released from chemical combination will exchange with sodium on the soil particles, thus reducing the sodium content of the soil with a consequent improvement in structure and permeability.

If gypsum is not present, it is necessary to apply it or some other form of amendment. In some cases, sulfur or sulfuric acid is used. Because of their relatively low cost, gypsum and sulfur are the most common amendments but sulfuric acid is often cheap enough for field application. The appropriate amount of gypsum or sulfur needed is based upon the sodium content in the soil.

Information on this point can be supplied by agricultural experiment stations and extension services of the western states. THE END

Largest apple orchard in one block in the state of Washington is the Johnny Appleseed Orchards near Okanogan. They comprise 400 acres in bearing trees and 240 in non-bearing, making a total of 640 acres. The orchards were planted in 1910, and 11,500 trees were recently set out as replants. A total of 23,500 trees have been planted recently, of which 16,800 are Starking Red Delicious. The balance are Red Rome, Golden Delicious, Bartlett and D'Anjou pears, and Elberta peaches.



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AMERICAN FRUIT GROWER Willoughby, Ohio

NON-TILLAGE SOIL MANAGEMENT

NON-TILLAGE without cover crop is the newest system of soil management being used in California citrus orchards. Permanent broad-base irrigation furrows or sprinklers are laid out, and all weed growth is destroyed by spraying with oil or suitable herbicides. The greatest advantage of this system is the improvement of the physical condition of the soil. Water penetration, in most cases, has so greatly improved that it has been necessary to shorten the length of furrows.

The University of California suggests that non-tillage can best be started in early summer following thorough spring cultivation. Permanent furrows are then established, their number and width depending upon slope and present texture of the soil. The weeds should be sprayed when about one inch high, and spraying should be repeated as often as growth reaches that height. Delay means more labor, more material, and more time required to eliminate the more resistant weeds.

The cost per acre under the system of non-tillage is greater than cultivation the first two years, about equal the third, and slightly less the fourth and succeeding years.

Other advantages of non-tillage are ease in orchard management and harvesting and warmer air temperatures during frost periods.

EXPANSION PROGRAM

CONSOLIDATED Mining and Smelting Company of Canada, Limited, announces that work will commence immediately on a major expansion of ammonia production facilities at its Alberta Nitrogen Department at Calgary, Alberta, Canada.

This is part of Cominco's long-range chemical and fertilizer expansion program. The project will provide sufficient additional ammonia to allow full operation of Cominco's large ammonium nitrate fertilizer facilities at Calgary, Alberta, and Trail, B. C., and will also allow sales of substantial quantities of anhydrous ammonia to meet the rapidly growing demand for this material in industrial and agricultural markets of the West. On completion of this project, Cominco estimates that its fertilizer output will be increased by more than 50,000 tons annually.

Orange tortrix has become a major pest on apricots in the Santa Clara Valley. University of California research workers have found that malathion is as effective as parathion against the tortrix and could be substituted for the May spray, if grower applications substantiate these results.

WINDFALLS

It is said that Isaac Newton while sitting under an apple tree was struck on the head by a falling apple. Thus he conceived the great truth of his Law of Gravitation.

A FORUM ON THE HUMAN SIDE OF ORCHARDING

Led by HENRY BAILEY STEVENS

Requiem for a Priestess THERE was an elemental passion in her love for growing plants. She helped me to plan the orchard and to hold fast through all its ordeals. She thought of the whole farm as a unit and struggled to improve the woodland and blueberry swamp. But she took direct and personal care of the gardens. In the summer they were her home as much as was the house. When she laid them out originally with stone walls a foot or two thick, I remonstrated. These rocks would prevent plowing and machine cultivation. But she was adamantine in rejecting the tractor, saying that it would pack the soil, require wide rows, and would not be instantly available.

She liked the stones and arranged them in the sloping vegetable area in cross walls so as to stop erosion. They made four "rooms" of equal size in which she could alternate beds and rows of lettuce, radishes, peas, potatoes, sweet corn, tomatoes, carrots, parsnips, beets, squash, cucumbers, melons—each a station in her daily round. Years later I learned in a book that the earliest gardens of which there is record were divided like this into quarters.

She was a true primitive, also, in not scorning to turn the earth by hand labor. Even a heavy clay soil did not faze her, and when the four-tined fork uncovered earthworms, she rejoiced. If a light shower came she would frequently refuse to be interrupted and would work on in the wet.

Nothing pleased her so much as to lead a child into appreciation of plant life. She would put a crawling baby down in the strawberry patch and share in his wondering glee at the taste of the first fruit. At planting time she would teach a three-year old to drop seeds and cover them with a pat of the warm soil.

"Grow, little seed," he would repeat after her, "Grow! Grow!"

Later he would learn to marvel at the green tip pushing up into the light, the strong stem and green leaves, the flowering, the fruiting, and above all the harvest. She did not fear weeds, using lamb's-quarters, dandelion, purslane, mustard, and dock as table greens and removing others for mulch.

In her garden she was a priestess, giving thanks to God for the Easter of the spring and the yield of the fall. The sweat of her body was not spent grudgingly. She never complained at the toil; she beamed as she worked. Through her I came to understand that the garden was indeed our first temple and our first school, and that our present systems would be improved if it became such again.

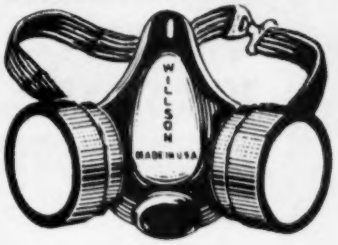
Her feeling was for culture in the original meaning of the word: the cultivation of the soil. Yet this in no way diminished—rather it accentuated—her enthusiasm for the arts. In winter she was quite content to let the garden lie dormant, and would work at her poetry and other literary projects. She founded a local MacDowell Club to foster artistic interest in all fields. She dared to denounce war vehemently and proclaimed that if other women would choose to do so, they could abolish this curse from the face of the earth.

Agnes Ryan believed in the immortality of the spirit and wrote:

"With garden resurrections every year,
Life after death is not so queer."

Joy in Her Work A FRIEND sent me the quotation inscribed to a famous gardener in an old English churchyard: "Her joy was in the work of her hands; her memorial is the beauty which lives after her." And another friend, this from Tagore: "Death is not putting out the light. It is only extinguishing a lamp because the day has come." THE END

FOR SYSTOX



USE

AGRI-TOX

The USDA accepted Universal Respirator that also protects against

• Parathion • Dieldrin
• Aldrin
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• Nicotine • TEPP
• HEPT

• This new Agri-Tox respirator is similar, except in the type of filter employed, to the well-known, light-weight and comfortable Willson Agrisol® respirator. And they're convenient for you to get through more than 100 distributors from coast to coast.

Write today for the name of your nearest distributor and the new bulletin describing this newest Willson Agri-Tox respirator for protection against all toxic insecticides, and for information on other Willson protective equipment for agricultural hazards at no obligation to you.

NOTE:

Present users of Willson Agrisol® respirators can easily convert their respirators to provide this universal protection by substituting the Agri-Tox filters, Part R490 for the present Agrisol filter, Part R414. Both respirators use the same cartridge, #11A.

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WILLSON PRODUCTS, INC.
Established 1870
118 Thorn St., Reading, Pa.

APPLES ARRIVE 100% SALABLE AND READY TO DISPLAY WHEN SHIPPED IN . . .

KYS-PAK

Extra strong, molded pulp KYS-PAK trays carefully *cushion* every apple, holding it apart in its own protective pocket. So, whether fruit is shipped 25 miles or 2500 miles, it arrives in *prime condition*, ready to display and sell!

Suitable for all varieties of apples, KYS-PAK are made in all sizes from 48 to 216. All these sizes when properly packed and graded will weigh 42 lbs. net per box. KYS-PAK fit wood, fibre or wire-bound boxes.

Keyes Fibre Sales Corporation, Dept. AF
420 Lexington Ave., New York 17, N. Y.

Please send us complete information on KYS-PAK for apples.

NAME.....

POSITION.....

NAME OF FIRM.....

ADDRESS.....

CITY.....ZONE....STATE.....

New

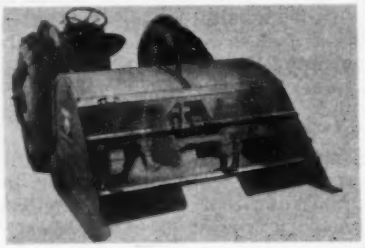
ROTARY CULTIVATOR

Unit straddles strawberry rows, tills on either side

A NEW machine called the Seaman Rotary Straddle-Row Cultivator has been developed to perform a task never before successfully accomplished for strawberry growers and growers of similar special row crops.

In early spring, strawberry rows and soil between are covered by growers with a thick layer of straw. This is left in place throughout the growing season and serves to retain moisture and keep down weed growth. After the berries are picked it is necessary to work this straw into the soil to promote humus and at the same time cut out root runners between rows.

Ordinarily this is a time-consuming job of precision cultivating. The new Seaman Straddle-Row Cultivator has been designed in co-operation with strawberry growers to perform this task in one quick operation.



Deflector plates inside hood of Seaman Straddle-Row Cultivator prevent soil worked up by rotary tines from being thrown on strawberry plants.

Developed on Seaman's Rotary Tiller principle, the new unit has several innovations. It is designed to *straddle* a row of plants, tilling and mulching on either side to a total width of four feet. A center aperture is built into the trailing edge of the rear hood to clear the plant row, and deflector plates are mounted inside the hood.

These deflector plates, passing on either side of the plants, prevent the soil worked up by the rotary tines from being thrown on the plants. The entire tiller mechanism is protected against damage by friction clutches mounted on the rotor shafts. Another advantage of the new machine is its ability to mix in fertilizer in the same cultivating operation.

Further details in regard to the new Seaman Straddle-Row Cultivator may be obtained from the manufacturer, Seaman Motors, Inc., 344 North 25th St., Milwaukee, Wis.

YOU CAN SEE THE DIFFERENCE with CAPTAN

DDT-50-W

Parathion 15-W & 25-W (dustless)

Dieldrin 50-W

Sulphenone 50-W

Stauffer CHEMICALS SINCE 1885

Stauffer Chemical Company
380 Madison Ave., New York 17, N.Y.
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WAXING APPLES

An experiment in waxing McIntosh windfalls and holding in storage returned a profit this spring

WOULD you pay $1.80 a bushel for McIntosh windfall apples seven months old?

Wagemaker & Son, Inc., of Alton, N. Y., asked for and received that price in April for McIntosh windfalls harvested last September. And the Philadelphia pie-maker who bought them agreed they were worth the price.

The apples had been subjected to the most severe bruising when they were blown from the trees in September, 1953; in some cases the skins had been completely broken.

During September select McIntosh windfalls were selling for $1 per bushel. W. A. Wagemaker did not feel there was sufficient profit in selling McIntosh windfalls at that price, so he decided to hold his apples until the market was right.

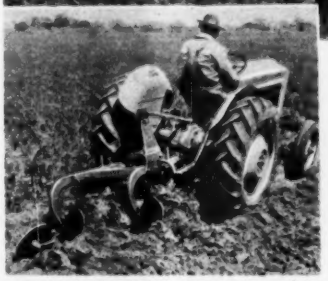
Wagemaker put his windfall apples through his usual waxing process. First, the apples were sized, then washed to remove spray and dust residues; also apples must be clean in order that the wax may be properly applied. The apples then went to the waxer where they were given a thin coating of Johnson Wax-Shine, a wax-in-water emulsion especially made for apples. The wax was applied by a drop-type waxer. A heating element heats the wax to about 100° F. and the wax is dripped onto brushes that apply it evenly on the apples.

Higher Prices Received

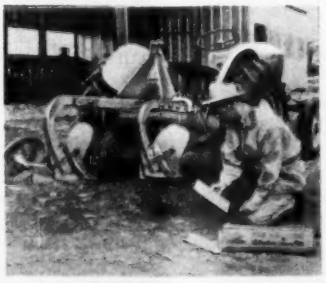
In addition to prolonging storage life, wax imparts a rich, natural shine to apples. Wagemaker has found that they consistently receive higher market prices for first grade McIntosh that are waxed. Waxing also minimizes rot transmission from one apple to another and eliminates rub burns and skin damage. Scalding of the skins as the apples come out of storage is also prevented.

Inspection of the windfall apples taken from storage after more than eight months showed they had lost only a small amount of moisture, as shown by their firmness. Cutting some of the most badly bruised apples in half showed how the wax had retarded respiration so that even the bruised areas had been kept from spreading.

Wax is economical to use, one gallon being sufficient for 100 bushels of apples. Wagemaker & Son estimated the cost of waxing to be $.006 or slightly more than one-half cent per bushel. -- *R. W. Solon, Johnson Wax Co.*



EXTRA TRACTION when you need it
As plowing draft increases, extra down pressure is automatically transferred from the plow to the Ford Tractor's rear drive wheels. This means less wheel slippage without loading the Ford Tractor with power and fuel-wasting dead weight.



"Razor Blade" Shares on the DEARBORN ECONOMY PLOW
are priced so low that you can replace them for far less than the cost of resharpening. You can save $10 to $30 per 100 acres plowed – also avoid the bother of having shares sharpened at a blacksmith shop.

Now's the time to see what a Ford Tractor can do in tough fall plowing, especially if your present tractor grunts and groans on tough pulls and drags along at a time-wasting crawl.

Right away, you'll notice the extra zip and power delivered by Ford's low friction "Red Tiger" Engine—the way it buckles down on tough pulls and keeps going.

Plow Up to One-Third Faster

Some farmers report their Ford Tractor plows up to one-third faster, actually plowing more acres per day than many bigger tractors that cost more money. They report considerable savings in fuel, too.

And, along with faster plowing, you'll find the job goes easier with the Ford Tractor. With a front wheel in the furrow, the Ford Tractor almost steers itself. At headlands, you just nudge the Hydraulic Touch Control lever to lift the plow out of the ground for easy turns. And you can adjust plowing depth while on the go with the same handy lever.

Your nearby Ford Tractor and Implement Dealer will be glad to bring out a new Ford Tractor and Dearborn Economy Plow to your farm so you can see what they can do. See him soon.

TRACTOR AND IMPLEMENT DIVISION
FORD MOTOR COMPANY
Birmingham, Michigan

Ford TRACTOR

Ford Farming GETS MORE DONE AT LOWER COST...

Dearborn EQUIPMENT

PLAN PRODUCTION
...you can with
PORTABLE SPRINKLER IRRIGATION

"PORTABLE SPRINKLER IRRIGATION

...a Must for Our Orchard"

says C. E. Dutton, Milford Center, Ohio

Mr. Dutton, who began orchard irrigation in 1930, and has irrigated 21 out of the past 24 years, says, "We have used various types of irrigation methods and equipment over the past years. Last season we purchased aluminum pipe and sprinklers which we have now used one season. We have found this to be the best method of distribution we have ever used.

"We find that both apples and peaches respond equally well to irrigation during periods of deficient moisture. We produced very nice crops of both apples and peaches this past season although we had only one rain of any consequence from late May until the first of December. As far as we are concerned portable sprinkler irrigation is very definitely a must in our orchard."

Mr. Dutton's story is typical of what sprinkler irrigation systems are doing for fruit growers in all parts of the country.

Plan production and increase the profits from your acreage with portable sprinkler irrigation. And remember—strong, lightweight, non-rusting Reynolds Aluminum Irrigation Pipe is the economical, efficient lifeline of your portable sprinkler system!

This label is your guarantee of genuine Reynolds Aluminum Pipe.

This sign identifies dealers who sell Reynolds Aluminum Irrigation Pipe.

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Member of SPRINKLER IRRIGATION ASSOCIATION

FREE! "More Income Per Acre"—the illustrated booklet telling all about portable sprinkler irrigation.

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2374 South Third Street, Louisville 1, Kentucky

Please send me your free booklet, "More Income Per Acre"

Name_____

R.F.D. or Street_____

Town_____ State_____

DEFICIENCIES

(*Continued from page 9*)

Epsom salts per 150 gallons in the calyx and first and second cover sprays. In severe situations a fourth spray may be applied. Under Maine conditions it has been possible to include the Epsom salts with the regular fungicide and insecticide program, but if there is some doubt of incompatibility, magnesium sulfate should be applied separately midway between the above sprays.

Boron Deficiency—Under severe conditions, buds in spring on certain limbs or in the tops of the trees may break poorly and slowly. Shoot growth may be short, thick, and stiff with narrow, puckered, or cupped leaves which are misshapen. Leaves have large veins for their size and are leathery and may have a glossy appearance. Some interveinal yellowing, particularly of the tip leaves, may be present. Depending upon variety, fruit may show external corkiness or internal cork areas in the core area. External cork may appear about June drop time, whereas internal cork can be detected about harvesttime. Fruit drop may be heavy near harvest and keeping quality poor.

Many New England growers have been using a half to one pound of borax per mature tree, spread in a band about 12 to 18 inches wide under the outside drip of the branches, either in fall or spring, every third growing season. Relatively less amounts of borax are applied on the lighter soils and for the smaller trees.

Potassium Deficiency—This is evidenced by a marginal leaf scorch usually appearing in mid or late season on the older leaves. Areas between the large veins may show dead spots in addition to the marginal scorching. Fruit color may be poor and size reduced. It is more likely to appear on trees that have been in bearing for several years.

Use of a complete fertilizer such as 10-10-10, or special applications of three to five pounds muriate of potash per mature tree should correct the deficiency.

Zinc Deficiency—This has been reported only in southern New Jersey, Virginia, Florida, and South Carolina, usually on the light sandy soils. It may appear on a few limbs anywhere over the tree, but usually in the top. Most limbs on a tree may show normal shoot growth and leaf and fruit size, whereas other sections are showing severe zinc deficiency. Symptoms consist of very small narrow leaves which may or may not show interveinal yellowing, leaf margins wavy, numerous small leaves may occur in rosettes on shoots with very short internodes. Apples are small and pointed on these limbs, although they may be well colored at harvest. Trees show a tendency to alternate bearing.

A dormant spray of 25 pounds of a

Fast
The Hale Centrifugal Orchard Sprayer

sprays efficiently as fast as your tractor can run through orchard or grove. Remote controls for convenience and saving of materials.

Write for Bulletin #302. State size of grove or orchard.

SPRAYER DIVISION

HALE FIRE PUMP CO.
CONSHOHOCKEN, PA.

Insist on **HALE**
Irrigation Pumping Units
Protect your orchard or grove against drought in 1954.

Write for detailed information. State No. of Acres and Source of Water Supply.
Irrigation Division, Dept. AF.

HALE Fire Pump Co.
Conshohocken, Pa.

Mulching Strawberries

Friday Straw Spreader

- Does a better job of mulching at less than hand labor.
- Can be set to mulch ON or BETWEEN rows.
- Handles wet and dry straw.
- Turbine air blast insures even coverage.
- Powered by Wisconsin air cooled engine. Can be pulled by any tractor.

FRIDAY TRACTOR CO.
Hartford, Michigan

NOW **A LOW COST APPLE BAGGER**

• Designed primarily for the smaller fruit grower the "Rapid Weigh" fills and weighs bags in one easy operation. This versatile machine will put out any size pack from 4 to 8 pounds. Only $165.00 complete with weights.

Convenient built-in stapler available at slight extra charge.

Write in today for further information

Dealer inquiries also invited.

AGRICULTURAL INSTRUMENT COMPANY
RFD #1 Box 373 STATE COLLEGE, PA.

25 per cent (flake) zinc sulfate (or 18 pounds of a 36 per cent powdered zinc sulfate) in 100 gallons of water is applied just before the buds break in spring. It is applied separate from other sprays, and a few days on either side of them. Regular dosage of zinc sulfate as a safener at about two pounds to 100 gallons used with lime and lead arsenate, should give a good maintenance supply of zinc. Two or three consecutive dormant-season applications may be needed if the deficiency is severe.

Manganese Deficiency—This is rather easily recognized and corrected. Where overliming has been practiced and the soil pH is above 6.5, manganese deficiency may appear. Some sandy soil types may be naturally low in manganese. The mid and basal leaves on shoots may show a lighter green between the main veins, giving the leaf a herringbone appearance. Tip leaves may be affected if deficiency is severe.

With manganese deficiency there is more area of a deeper green coloring around the main veins than in case of other mineral nutrient deficiencies that cause interveinal yellowing, except possibly in case of magnesium deficiency. It may appear rather early, and as the season progresses the leaves may attain a lighter green color and drop a few weeks earlier than normal. Tests in New Jersey indicate poor wood color on peach and poor fruit color on apple to be associated with low manganese supply.

One spray of 65 per cent manganese sulfate at three pounds (no lime) in 100 gallons of water, applied after most of the foliage has developed, should be effective in correcting the deficiency symptoms. For apple, in some cases, five pounds of manganese sulfate in 100 gallons has been used. Manganese is relatively non-toxic to foliage. We have mixed it successfully with several common fungicides and insecticides, but a general recommendation on this may prove hazardous. If in doubt apply it separately to the foliage midway between regular sprays. THE END

Fruit Nutrition is a new and timely book which deals with fruit tree fertilizer deficiencies and minor element nutrition. Editor Norman F. Childers of Rutgers University has called upon a distinguished list of research workers to author the different chapters. It contains chapters on all the important fruits and includes a wealth of photographs which in themselves are an invaluable collection for a fruit grower's library. The book contains 900 pages with basic information bound to open the eyes of fruit growers and cause reappraisal of orchard cultural practices. Cost of the book is $10, and it may be secured through the Readers' Service Department, AMERICAN FRUIT GROWER, Willoughby, Ohio.

Alford Cartons

Fanci-Pak
(Trademark Registered)

THE TRULY NEW PACKAGE FOR APPLES, PEACHES, and other fruit

Sells more fruit, Eliminates Spoilage, Reduces Costs, and Brands Your Product

Alford Cartons
Division of Continental Paper Company
RIDGEFIELD PARK, NEW JERSEY

46 Surplus Twist DRILLS $2

GENUINE, HI-GRADE, CARBON TOOL STEEL, BRAND NEW

Less Than 4½¢ Each!

FOR HAND OR ELECTRIC DRILLS: Hobbyists! Homeowners! Carpenters! Almost your last chance to get 46 brand-new, carbon tool-steel twist drills at this low price. Sell for up to $6 in stores... You get about 5 each of all most used sizes from needle-sized 1/16" up to and including ¼". Tempered cutting edges easily bite through steel, aluminum, iron, wood, or plastic. Each drill hardened and designed to give 1800 drillings. Limited supply going fast!

ORDER TODAY! MONEY BACK IF NOT CONVINCED THIS IS ONE OF THE GREATEST DRILL VALUES EVER!

Rush $2 for each set ordered and we pay postage. If C.O.D. you pay postage.

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If Ruptured Try This Out

Modern Protection Provides Great Comfort and Holding Security

Without Torturous Truss Wearing

An "eye-opening" revelation in sensible and comfortable reducible rupture protection may be yours for the asking, without cost or obligation. Simply send name and address to William S. Rice, Inc., Dept. 84-D Adams, N.Y., and full details of the new and different Rice Method will be sent you Free. Without hard flesh-gouging pads or tormenting pressure, here's a Support that has brought joy and comfort to thousands—by releasing them from Trusses with springs and straps that bind and cut. Designed to securely hold a rupture up and in where it belongs and yet give freedom of body and genuine comfort. For full information—write today!

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50 GALLON • 30 GALLON • SMALLER SIZES

For wines, cider, pickles, etc.

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Atwood 6531 Louisville, Ky.

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• NOW we issue a New York State Dept. of Agriculture certificate which guarantees our cherry trees to be virus-free. Supplies of fruit trees are limited. It will pay you to order early this season. Our fruit trees . . . APPLES, PEARS, CHERRIES, PLUMS, PEACHES . . . are sturdy, northern-grown stock. Write for FREE CATALOG today.

KELLY BROS. NURSERIES, INC.
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RAKES PLOWS CULTIVATES HARROWS HAULS SPRAYS SAWS DOZES MOWS CUTS ROLLS TILLS SNOW PLOW

ESHELMAN FOR Better LAWNS And GARDENS

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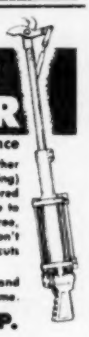
338 N. Michigan Ave., Chicago 1, Ill.
7070 Hollywood Blvd., Los Angeles 28, Cal.

NEW MODEL C
Orchardkraft AIR-POWER PRUNER



New Features — New Performance

Offers many advantages not available on other pruners. New air-cushioned action (pat. pending) eliminates shock when limb is cut; Air-powered valves require only slight finger pressure to operate, no oiler needed; simple trouble-free, freeze-proof valves. Cuts faster, easier, won't slip off limb, works in narrower places, cuts limbs up to 1¼" diam.

Write today for free folder on pruners and orchard supplies — mention dealer's name.

JOHN C. BACON CORP.
• Gasport, New York •

Grow Roots on Branches of Trees and Shrubs Right on the Plant in Mid-Air
PROVEN YEAR AROUND METHOD
SUCCESS GUARANTEED
• Easy Illustrated Proven Branch Rooting Pack With Material to Root 50 Branches
Only $2.00 Postpaid — 3 for $5.00 Postpaid
MAKES A PERFECT GIFT
Quantity Prices to Qualified Sales Organizations
ROBBINS GARDENS—Sec. F
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Yes, money sure grows on trees when you use.....

TRIANGLE BRAND COPPER SULPHATE

TRIANGLE BRAND COPPER SULPHATE BORDEAUX MIXTURE gives added assurance of a yield of quality fruits that means extra profits to you. It controls fire blight on apple and pear, *Mycosphaerella* leaf spot of pear, peach leaf curl, black knot of plum and prune, brown rot and leaf spot of plum and prune, leaf blight and fruit spot of quince, leaf spots of currants and gooseberries, downy mildew of grape, black rot of grape, and powdery mildew of grape.

Control POND SCUM and ALGAE with Triangle Brand Copper Sulphate. Write today for information on how it can help you maintain healthy water conditions.

For more than 50 years, prosperous commercial growers have obtained better yields at less cost by using **TRIANGLE BRAND COPPER SULPHATE** to protect their fruit crops. We recommend that you do the same.

SEND TODAY FOR OUR AGRICULTURAL BULLETINS GIVING DETAILED INFORMATION ON HOW TO USE TRIANGLE BRAND COPPER SULPHATE AND BASIC COPPER SULPHATE.

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40 WALL ST., NEW YORK 5, N. Y. • 230 N. MICHIGAN AVE., CHICAGO, ILL.

MAKE MONEY
ADDRESSING ENVELOPES
OUR INSTRUCTIONS REVEAL HOW
GLENN GLENWAY 5713 EUCLID AVE., CLEVELAND 3, OHIO

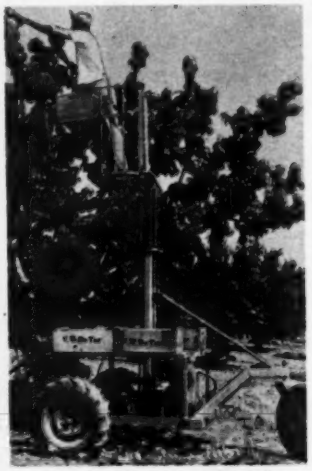
APPLE BOXES and FIELD CRATES
BOX SHOOKS, WIRE BOUND BOXES
MARINETTE & MENOMINEE BOX COMPANY
Marinette, Wis.

The AP-PEACH PICKING BAG
Saves Time—Reduces Bruising
Heavy canvas over rigid frame protects fruit. Empties quickly through bottom. Especially for peaches and easily bruised apples. Write for folder.
JOHN C. BACON CORP., GASPORT, N.Y.

This Ad Is Worth $2.00 to You
with your ebook for bargain offer listed below on our Chinese Blight Proof Chestnut trees. 4 and 5 yrs. old, 4 to 7 ft., 25 trees, $29.95. 2 and 3 yrs. old, 2 to 4 ft., 25 trees $19.95. When ordering ask for color literature and prices on other lots—some low as 10c each, all Peter Liu strain. First quality trees cannot be sold lower. We are the Nation's oldest and largest producers of these trees. SALES PEOPLE WANTED.
THE GOLD CHESTNUT NURSERY,
BOX 147, COWEN, W. VA.

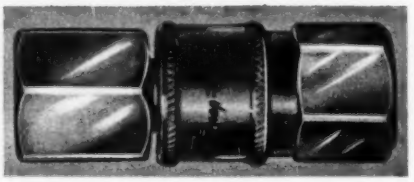
NEW FOR YOU

Steel Squirrel



With the Blackwelder steel squirrel, one man can do the work of three—and what's more, a lot more easily. The machine has a built-in air compressor for power pruning and the operator rides from tree to tree steering the machine at any desired height. E. F. Blackwelder, Blackwelder Manufacturing Co., Rio Vista, Calif. will send you all the facts.

Easier and Better



The new Snap-Tite couplers, made in a variety of sizes, are extremely easy to use and withstand pressures up to 800 pounds. Growers have used them on hydraulic sprayers and equally well on power pruners. We urge you to write Tom Welsh, Snap-Tite, Inc., 201 Titusville Rd., Union City, Pa., for details.

New Trailer

Ed Neilsen, Hughson, Calif., has made a most useful trailer to use with his Towmotor lift truck. The trailer has a folding

OPPORTUNITY ADS

NEW ELECTRONIC REPELLENT "DEER FLY" stops deer damage. Only $19.00 from WILDLIFE ASSOCIATES, Box F265, Pittsfield, New Hamp-

- **STEEL SQUIRREL**
- **ORCHARD TRAILER**

frame which allows him to take a pallet of boxes from between the trailer wheels at the rear without the wheels hindering the procedure. The trailer frame is made of heavy channel iron and measures 16½ feet long. For information, write either Al Roth, Towmotor Corp., 1226 E. 152nd St., Cleveland, Ohio, or Ed Neilsen, Hughson, Calif.

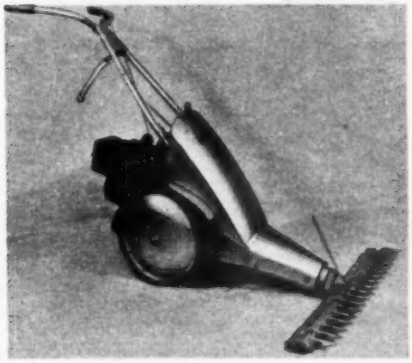
Cut Orchard Costs

The new Wright power saw does an accurate job yet weighs less than 25 pounds. The blade eliminates pinching or grabbing so the grower doesn't spend his time wrestling with the saw. Simply write John Horgan, Wright Power Saw and Tool Corp., 292 Longbrook Ave., Stratford, Conn., for a pamphlet on this saw.

Efficient Spraying

John Bean has just issued a new booklet on all types of spraying. Well illustrated, it includes the entire John Bean line from big speed sprayers down to knapsack sprayers. To get your copy, write Eldon Robbins, John Bean Division, Food Machinery and Chemical Corp., Lansing 4, Mich.

Jari Champion



The new Jari Champion handles more easily than older models. It has a floating sickle bar which lies flat on the ground regardless of position of tractor wheels. The sickle bar can be locked in a horizontal position. Wheels are set farther apart for better stability. Write Al Paulson, Jari Products, Inc., 2938 Pillsbury Ave., Minneapolis, Minn., for your free folder on the Champion.

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Move boxes, cases, cartons, sacks or bundles from basement to first floor, or any floor to floor — continuously with the Standard Inclinebelt. Compact — simple to install — minimum maintenance and attention. Lifts or lowers 10 to 20 lbs. of live load per ft.; floor elevations of 8 ft. to 14 ft. 6 inches inclusive; two belt widths to handle commodities 15½ inches to 25½ inches wide. Electric motor operated. Write for INCLINEBELT Bulletin — address Dept. AFG-94

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GRAVITY & POWER CONVEYORS

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Complete Corkboard
INSULATION SERVICE

From engineering design to complete erection, United Cork Companies offers complete service on B.B. (Block-Baked) Corkboard through its chain of branch offices from coast to coast.

Each installation of United Cork Companies' B.B. Corkboard is *specifically* planned for the requirements of the individual fruit storage area. And each installation is followed up by United Cork Companies' engineers to assure full satisfaction to the fruit grower.

You are invited to discuss your low-temperature insulation requirements with us.

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DEPARTMENT I-10
KEARNY, NEW JERSEY
BRANCH OFFICES IN PRINCIPAL CITIES

Advertisement

From where I sit ... *by* Joe Marsh

Treed by a cat!

Big commotion on Maple Street last Tuesday when the Adams' cat chased a squirrel up a pine tree—and then couldn't get down.

A crowd collected and "Tiny" Field, the policeman, climbed to the rescue. But the cat went to the other side of the trunk and carefully clawed his way to the ground.

Tiny started to come down, too, but his revolver belt got snagged on a limb. Tiny was stuck! Someone called the hook 'n' ladder and the firemen finally rescued him.

From where I sit, even though we laughed at Tiny a little bit—we were actually pretty proud of him for going out of his way, for doing more than his duty. Most times it's little "extras" that bring a lot more happiness into this world. Sometimes it's just a simple thing like a friend offering *me* a glass of temperate beer when I know *he* prefers something else. Call it tolerance, call it neighborliness . . . whatever it is, my opinion of him automatically "climbs" sky-high.

Joe Marsh

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VIRUS-FREE TREES

OPPORTUNITY ADS

Only 25c a word for one-time insertion; 20c a word for two-time insertion; 15c a word for four-time insertion—CASH WITH ORDER. Count each initial and whole number as one word. Address AMERICAN FRUIT GROWER, Willoughby, Ohio.

AGENTS WANTED

MONEY FOR XMAS! MAKE $50 AND MORE during spare time. Friends, neighbors—everyone buys from Elmira's exquisite new sparkling line. Imprinted Christmas cards for as little as 3c. Personalized stationery, napkins, large gift wrappings with free accessories, ribbon ties . . . all fine quality money saving values. No experience needed. Send name and address for free portfolio, catalog, assortments on approval. Bonus plan. Elmira's "Portable Gift Shop" makes money first day. Write today. ELMIRA GREETING CARD CO., Dept. C 268, Elmira, N.Y.

MAKE MONEY SELLING TIES. BUY DIRECT from manufacturer. Write PHILIP'S NECKWEAR, 20 West 22nd, Dept. 324, New York.

RUN SPARE-TIME GREETING CARD AND gift shop at home. Show friends samples of our new 1954 Christmas and All-Occasion greeting cards and gifts. Take their orders and earn to 100% profit. No experience necessary. Costs nothing to try. Write today for samples on approval. REGAL GREETINGS, Dept. 126, Ferndale, Michigan.

BUSINESS OPPORTUNITIES

GROW MUSHROOMS, CELLAR, SHED, SPARE, full time, year round. We pay $3.50 lb. We paid Babbitt $4,165.00 in few weeks. FREE BOOK. WASHINGTON MUSHROOM IND., Dept. 127, 2954 Admiral Way, Seattle, Washington.

CIDER PRESSES

CIDER AND WINE PRESSES, HAND AND hydraulic, new and rebuilt. Repairs and supplies, clarifiers and filters. Pasteurizers and bottling equipment. Write for supply catalogue. W. G. RUNKLES' MACHINERY CO., 185 Oakland St., Trenton, N.J.

FOR SALE: 2 SMALL AND ONE LARGE HYdraulic cider presses in good condition. WESLEY ORBAKER, Williamson, N.Y.

CIDER PRESS, 42 INCH MOUNT GILEAD, racks, cloths, tanks, electric motors, etc. Complete in good condition. WAMPLER FRUIT FARMS, Route 1, Dayton, Ohio.

CIDER MILL OPERATORS: SAVE ON PRESSing cloth needs. N. C. JOHNSTON, Columbia City, Indiana.

FOR SALE—EQUIPMENT AND SUPPLIES

GOOD USED FARM CONTAINERS—SPLINT handle baskets, bushels, boxes, hampers, bags, nailed and wire-bound crates. Truckload or carlots. Call or write ZELVY BROS. CONTAINER CO., 2005 Orange Ave., Cleveland, Ohio.

KLEEN-AIR ACTIVATED CARBON COMplete reactivation service all makes. We use coconut shell carbon 100 percent. New carbon units for sale or lease. Write HOWARD S. CALDWELL CO., 721 East Main St., Lancaster, Ohio.

1—SPEED SPRAYER, GOOD CONDITION . . . $1000.00. 1—Bean PTO Duster, used one night only. Bargain. 1—Niagara Duster, used one season . . . $500.00. 1—Small Grader for apples and peaches . . . $150.00. 1—500 gal. Bean Sprayer 35 pump. Bargain. CORY ORCHARDS, Cory, Indiana.

A FEW BRAND NEW PNEUMATIC ORCHARD pruners in original cartons for sale. Being sold to settle estate of large grower. These pruners can be purchased at half original cost. They are all in perfect condition, never used, and are a well known brand. One new and one slightly used Worthington gasoline compressors for sale also. Write HIGHLAND ORCHARDS, Box 415, Fairport, N. Y.

CONTROL CHERRY LEAF SPOT WITH ACTIspray, the new antibiotic in handy tablet form. Carton containing 24 tablets only $16.95 postpaid. Descriptive literature available. THE HOLLANDIA GARDENS, South Vienna, Ohio.

NEW ELECTRONIC REPELLENT "DEER FLY" stops deer damage. Only $19.00 from WILDLIFE ASSOCIATES, Box F265, Pittsfield, New Hampshire.

CHAIN SAW $169.50 COMPLETE KIT. 3 HP 20" chain guaranteed. Assemble-Yourself-Save. Outboard Motor 4 HP $99.50. TRAIL BLAZER PRODUCTS, Box 5142, Grosse Pointe, Michigan.

TWELVE HOSE-BOYS. USED SLIGHTLY ONE season. Will sell individually or together. RAUTH FARMS, Greenacres, Florida.

FOR SALE, FORKLIFT GAS OPERATED. SOLID RUBBER TIRES. 2,000 lb. cap. FLUKE'S ORCHARDS, Curryville, Pa.

FOR SALE—ORCHARDS

FOR SALE: 72 ACRES, 42 ACRES 25 YEAR OLD apple trees; 20 acres double planted; 1500 trees; packing shed, grader and equipment, sprayer, duster and two tractors; new modern house; deep well; abundant water supply. 15 miles from Terre Haute, Indiana. JOHN HAXTON, R.R. 1, Pimento, Indiana.

CONNECTICUT APPLE ORCHARD AND GENeral farm. Beautiful estate, 130 acres, 65 acres in fruit, 12-room, 2-bath residence, 15,000 bu. cold storage. Established door trade. Farm completely equipped and household furnishings. This year's crop included. Must be seen to be appreciated. HIGHLAND ORCHARDS, Westerly, R. I. on Route 95.

FOR SALE OR LEASE, BEST FRUIT DEAL IN Washington. Contact J. E. WILSON, Wawawai, Washington.

APPLES, PEACHES AND PLUMS, 1300 TREES. For full information write or phone J. D. BRENNAN, R3, Yale, Michigan, owner.

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RETIREMENT HOMES, EASY PAYMENTS, nothing down; gardens, chickens, fishing. List free. PERY, Brierhill, Penna.

HORSE TRAINING

"HOW TO BREAK AND TRAIN HORSES"—A book every farmer and horseman should have. It is free; no obligation. Simply address BEERY SCHOOL OF HORSEMANSHIP, Dept. 1389, Pleasant Hill, Ohio.

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FREE BOOK—PILES, FISTULA, COLON-STOMach, associated conditions. Newest scientific procedures. THORNTON & MINOR HOSPITAL, Suite C-912, Kansas City 9, Mo.

MISCELLANEOUS

WINES: MAKE YOUR OWN FROM GRAPES, raisins, berries. No special equipment needed. Printed directions, 25c coin. TIMBERLAKE ENTERPRISE, Box 1401, Denver 1, Colorado.

BERRY BOOK: "THIRTY YEARS OF BERries." Raspberries & Strawberries, 84 pages, price $1. Postpaid. ROY TURNER, 315 Livingston St., Peoria, Ill.

LEAKY RADIATORS FIXED WHILE YOU drive. Guaranteed solution $1.25 postpaid. N. C. JOHNSTON, Columbia City, Indiana.

FLOWER BULBS. CHOICE COMMERCIAL flower bulbs for commercial flower growing or resale. Descriptive lists and information free. Write for current list now. REGAL BULB CO., Holland, Mich.

WRITE FOR FREE LITERATURE ON HOG Cholera, Erysipelas, Hemorrhagic Septicemia and other livestock diseases. COLORADO SERUM COMPANY, 4950 York St., Denver 16, Colorado.

MONEY MAKING OPPORTUNITIES

MAKE MONEY ADDRESSING ENVELOPES, sparetime. GLENWAY, 5713 Euclid, Cleveland 3, Ohio.

OF INTEREST TO WOMEN

MAKE MONEY ADDRESSING ENVELOPES, sparetime. GLENWAY, 5713 Euclid, Cleveland 3, Ohio.

EMBROIDER STAMPED LINENS. BUY DIrect from manufacturer and save. Send for FREE catalog. MERRIBEE, Dept. 507, 22 West 21st St., New York 10, N. Y.

AMAZING SEWING SHEARS. MAGNETIC points pick up pins. Ruler blade measures as you cut. Samples sent on trial. KRISTEE 104, Akron, Ohio.

TRADE MARKS

NATIONAL TRADE MARK COMPANY, MUNsey Building, Washington, D. C.

WANTED TO BUY

UNIMPROVED FARM, OR RENT ONE. J. H. AYER, Newtown, Ohio.

"I declare, I've finally found somethin' wider'n you, Paw —them new B. F. Goodrich Power-Grip tires!"

Measure the tread on a new B. F. Goodrich Power-Grip tractor tire. You'll find that no other tire is wider! Now count the cleats. Time after time you'll find the Power-Grip tire has more cleats! Power-Grip cleats are bigger and higher at the shoulders to slice into the soil easily, penetrate deeper. Result: full traction across the entire width of the tread in forward or reverse. B. F. Goodrich has reinforced Power-Grip cleats at the base so they stand rigid under pressure. You get longer wear from bigger Power-Grip cleats, bigger Power-Grip shoulders! Here's a tractor tire that not only looks bigger but *is* bigger! See the powerful, new Power-Grip tire at your B. F. Goodrich retailer's. The address is listed under Tires in the Yellow Pages of your phone book. Or write *The B. F. Goodrich Company, Tire & Equipment Division, Akron 18, Ohio.*

An advertisement of B. F. Goodrich—First in Rubber

VIRUS-FREE TREES

(*Continued from page 7*)

cherry is the carrier of the X disease in cherries and peaches. Removal of these trees has gone a long way in preventing further infection of stone fruit trees.

The next and probably the most important step in the virus battle is to index and propagate virus-free strains of our commercial fruit varieties. Progressive nurseries in co-operation with federal and state research men have come a long way in this program.

The first step in the production of certified virus-free nursery stock is the selection of a parent tree of known performance that is true to type and carries all the desirable characteristics of the variety.

Indexing the tree for freedom from harmful viruses is the next step. This consists simply of the following procedure. Buds are taken from a select parent tree and inserted in a special indexing host plant which has been shown to exhibit symptoms or the presence of hidden or masked viruses that may be present in a variety that does not itself show symptoms. The selected host plants for indexing are peach, virus-free Montmorency, Kwanzan, Shriofugen flowering cherry, and *Prunus tomentosa*.

Once a virus-free parent is located the next step is the development of a scion orchard of trees propagated from this certified parent. This scion orchard must be well isolated and all trees of related species that might be subject to viruses must be removed from the environs. The nurseryman then cuts his buds from the certified mother scion block for the nursery propagation of trees to be grown for orchard planting. It is also highly desirable to isolate nursery stock as much as practical to insure against infection of the young trees.

Virus-Free Seedlings

More recently evidence has been found that some of these serious virus diseases are seed borne. This has added another step to the certification program. We must now index and certify the seed trees used in the production of the rootstock for variety propagation. Here again the seedlings must be grown in isolation to prevent contamination.

All of this may seem to indicate a tremendous increase in cost of production of certified fruit trees. To a degree this is true, but a good portion of these costs have been offset by better bud and graft stands in certified nursery blocks, more uniform trees of the preferred size and type, and a gradual preference on the part of progressive growers to plant only certified trees.

Growers gain greatly in this new program as they are practically assured of true-to-name stock of vigorous, healthy, well-grown trees that will get off to a quick start and come into uniform production of quality fruit. THE END

Be Sure With
GREENING'S TREES

- BUD SELECTION
- ALL ORDERS GUARANTEED
- PROVED and PROFITABLE VARIETIES

The Greening Nursery Company, one of the leaders in bud selection, have for over 100 years given all growers the benefits of their research and improved strains which mean greater orchard profits.

AGENTS
Earn extra money, full or part time. It's pleasant and profitable to sell Greening nursery stock. Write us today for all of the details.

Send 10c to cover postage for the Greening 100-year anniversary 88-page color catalog.

GREENING'S BIG NURSERIES — TREES YOU CAN TRUST — MONROE MICHIGAN

THE GREENING NURSERY CO.
P. O. BOX 605 MONROE, MICHIGAN

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SIMS BIG NEW CATALOG OF *Orchard Tested* FRUIT TREES

Complete line of: Berry Plants, Shrubs, Evergreens, Shade Trees, Garden Roots, Nut Trees

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New Color Illustrated CATALOG of C & O "Better Varieties" which mean successful paying orchards. Hardy, northern grown trees

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OVER 50 YRS OF GROWING. P.O. BOX 310 SHERWOOD, OREGON

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Nut and Shade Trees, grape vines, flowering shrubs, evergreens. Over 80 Years, through four generations, growing and distribution service to planters guarantees satisfaction. Our FREE 60 page catalog illustrates, describes complete nursery line, including dwarf trees.
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Evergreen Lining-Out Stock
TRANSPLANTS and SEEDLINGS
Pine, Fir, Spruce, Canadian Hemlock, Arborvitaes, in variety. For growing Christmas trees, Ornamental landscape, Hedges, Windbreaks, Forestry. Quality stock low as 2c each on quantity orders. Write for price list.
SUNCREST EVERGREEN NURSERIES, Dept. AFQ, Box 305, Homer City, Pa.

BUSHTYPE
EVERBEARING STRAWBERRY
Division Postpaid

12 Division	$2.50	50 Division	$ 8.00
25 Division	4.25	100 Division	15.00

Ideal under irrigation. No trouble with runners. High yielding. Easy to pick. Large uniform size. Excellent flavor. Circular on request.
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BLUEBERRY PLANTS
Wholesale and Retail
17 VARIETIES
Order now for Fall Planting
MONROE FARMS
Box 555, Browns Mills, N. J.
Send for Literature and price list

Maloney FRUIT TREES
Write for big FREE Color Catalog. Stock Northern grown on 600 acres in Dansville. Priced right. Fruit Trees, Berries, Shrubs, Roses. Satisfaction guaranteed. Our 70th year.
MALONEY BROS. NURSERY CO.
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PEACH APPLE TREES LOW AS 20c
Cherries, Pears, Plums, Nut trees, Strawberries, Blueberries, etc. Grapes 10c. Shrubs, Evergreens, Shade Trees, Roses 25c up. Quality stock can't be sold lower. Write for FREE color catalog and $2.00 FREE bonus information.
TENNESSEE NURSERY CO., BOX 4, CLEVELAND, TENNESSEE

American Fruit Grower
• Fruit for Health •

RICHARD T. MEISTER, *Editor*
H. B. TUKEY, *Associate Editor*

The Nurseryman, The Inspector, and The Virus Problem

ONE of the most important, yet almost unnoticed advances in fruit growing in America in recent years is the close, sympathetic, and understanding cooperation which has developed between the nursery inspector and the nursery industry. Almost sworn enemies a generation ago, the two groups are now working together with remarkable smoothness, to the betterment of both the fruit industry and the nursery industry.

One of the factors responsible in a large measure for this change has been the threat posed by virus diseases. The old problems of scale, peach leaf curl, and tent caterpillar were controlled by regular inspections of nurseries. Foreign troubles, as Japanese beetle and gypsy moth, were handled with less ease and only by the troublesome quarantine method. The disposition was to "get by" if one could.

But the virus diseases and their dreadful threat changed all this. Viruses became especially troublesome on the West Coast, where climatic conditions seem more favorable for development than in the East. Also, the stone fruits and the small fruits became relatively of far greater importance economically, and virus troubles are serious on these two groups.

Entire plantings of strawberries were seen destroyed by mosaic in a single year. The red raspberry industry in the Hudson River Valley all but disappeared for a spell. The sour cherry industry was threatened by yellows. Peach yellows and little peach baffled control.

And so the time became ripe for an appreciation that if the fruit industry and the nursery industry were to survive, virus diseases must be controlled. The pathologist added his bit of information and recommended roguing and budwood certification and virus-free plants. The inspection system moved in heavily with severe regulations and enforced the measures. The nursery industry found it an advantage to be able to advertise certified stock.

So far, this is all well and good, but the menace of virus troubles is constantly pressing. To date, virus research and virus control have been allowed to develop here and there in nearly every state in the Union. There have been sporadic attempts at concentrated regional attacks on the problem. But the real job is still ahead.

We need to pool our resources in a few carefully selected regions. We need to provide the finest research facilities available. We need to collect the most brilliant workers in the virus field.

The British Isles have done this with their new Scottish Research Institute at Dundee. We need to do something similar, but to adjust it to the many diverse regions in this country.

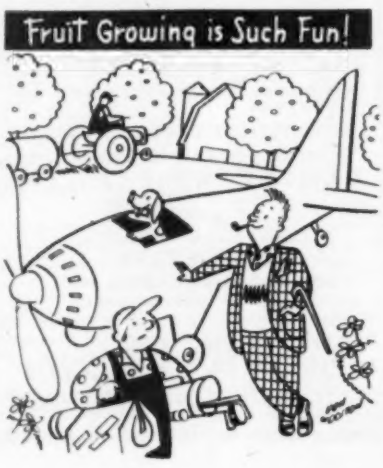
Yes, we can properly congratulate ourselves that all agencies are working so harmoniously together; but we should at the same time look ahead with vision and courage and do a man-sized job on a man-sized problem. The money and the opportunity are here. Let's do it.

The Value of an Orchard

WHAT determines the value of an orchard? We are asked the question frequently and it is a hard one to answer. Soil and site, varieties planted, age and thriftiness of trees, and freedom from disease and frost hazards are important factors.

However, we are more and more coming around to the opinion that the skill of the owner is of paramount importance. Some orchards are worth a tremendous amount because of the ability of the owner to develop and exploit his opportunities.

It all boils down to the fact that managerial ability and making the correct decisions play a big part for success in the orchard game. Neglect, whether intentional or otherwise, takes a heavy toll, more so with orchards than with other types of farming.



Fruit Talk

The **American Can Company,** in announcing a specially designed flat top can for carbonated beverages, looks forward to **12 and 13 billion soft drink cans a year.**

Says **Vernon B. Tuttle** of Warren, Mass., "The single aim of the apple grower should be to get high quality apples in fresh-from-the-tree condition, free from bruises and blemishes, to the consumer."

"The Prairie Home Orchard" is the self-explanatory title of an attractive 67-page publication by **W. R. Leslie,** superintendent of the Dominion Experimental Station, **Morden, Manitoba,** nicely illustrated and with a beautiful cover in color—for which Canadian publications have an enviable reputation.

2,4-D has proved a most effective spray (eight p.p.m.) in reducing fruit drop of **grapefruit** in California, according to **Stewart and Parker of Riverside.**

An interesting study by **J. W. Lucas** reporting from the **University of California** at Los Angeles on ice formation in lemons shows that when lemons are rubbed together they do not reach subfreezing temperatures as easily as non-rubbed—suggesting support for the common idea that **wind lessens subcooling in plants.**

Griggs and Iwakeri of California have showed clearly that the Bartlett pear is practically self-sterile. It is able to produce **satisfactory crops in most California orchards** because of the **ability** to set **parthenocarpic fruits** (without pollinator or fertilization).

One of the English magazines carries a commercial advertisement for **medium-sized, controlled-atmosphere storages of 2,500-bushel** capacity. This is a small enough unit to be useful on many farms.

Canadian workers **Phillips, Bucher, and Stephens of Nova Scotia** have found that a certain bacterium isolated from dead larvae of codling moth and sprayed onto captive codling moth, markedly reduced the population of this pest.

A publication from **Spain** offers a key to the identification of 15 **American grapes** used as rootstocks there. We seldom think of American grapes in this way.

Where erosion is severe in orchard roadways, try heavy applications of **sawdust;** or **use the brush cutter.** Both systems work well.

Enthusiastic reports come from **Emneth, Norfolk, England,** about a seedling strawberry found growing **in the wall of the Parish Church** which has been propagated and found to be an **exceedingly promising new variety** with fine flavor and fine handling qualities.

Superphosphate applied to **grapevines** as a foliage spray at two to 10 per cent dilutions, five times between July 10 and September 10, increased the yield and vigor content of grapes and improved next year's fruit bud development, according to **Portjanko of Russia.**

—*H. B. T.*

Coming Next Month

- **Solving the Peach Replant Problem**
- **Okanogan—The New Apple Capital**
- **Science of Cherry Culture**
- **Ground Sprays for Mouse Control**

keep fruit sanitary, build brand preference with "C"

VISQUEEN® polyethylene film

the ink stays on

Here are six reasons why **VISQUEEN** is the preferred film for all types of flexible packages:

1. **VISQUEEN** is stronger—won't split, crack, shatter or run.
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3. **VISQUEEN** won't block—keeps packaging lines at top speed.
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6. **VISQUEEN** is economical—cuts package costs as much as in half.

Important: VISQUEEN film is all polyethylene, but not all polyethylene is VISQUEEN. VISQUEEN film is produced by process of U. S. Patents No. 2461975 and 2632206. Only VISQUEEN has the benefit of research and technical experience of The VISKING Corporation, pioneers in the development of pure polyethylene film.

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Yakima Fruit and Cold Storage Co.'s "Happy Apple" brand apples retain crispness, cleanliness in bags made of VISQUEEN "C" polyethylene film.

call for the experts

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Send me names of converters of VISQUEEN film serving my area.

Name_____ Company_____

Address_____ City_____ Zone_____ State_____

Minnesota farmer gives three good reasons for operating an

"All-Chevrolet" Farm

A. D. Brynteson, of Litchfield, Minnesota, shown with his all-Chevrolet farm fleet, has been buying Chevrolet cars and trucks for the last six years.

From his own experience, A. D. Brynteson can tell you a lot about Chevrolets. How they actually cut costs in the operation of his 80-acre farm. How dependable they are. And how Chevrolet value is still way up when it comes time to trade on a new model. Mr. Brynteson also likes the time-saving convenience of having one specialized source for all his automotive needs—cars, trucks, parts and service. Here, he sums up three good, solid, sensible reasons for any farm man to go "All-Chevrolet."

Mr. Brynteson says: "Original and operating costs of Chevrolet are lower."

Absolutely. Chevrolet offers the lowest-priced line of *both* cars and trucks. Operating costs are extra low, too!

"We got 220,000 miles from the same motor in one of our units," states Mr. Brynteson.

He knows that you can rely on Chevrolet units!

Also, he says: "They have a higher resale value."

That's traditional with Chevrolets!

Talk over the many advantages of an "All-Chevrolet" farm with your Chevrolet dealer. . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

MORE PEOPLE BUY CHEVROLET CARS AND TRUCKS THAN ANY OTHER MAKE!

CHEVROLET